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# COLLISION AVOIDANCE RADAR NAVIGATION SYSTEM (CARNS)

**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

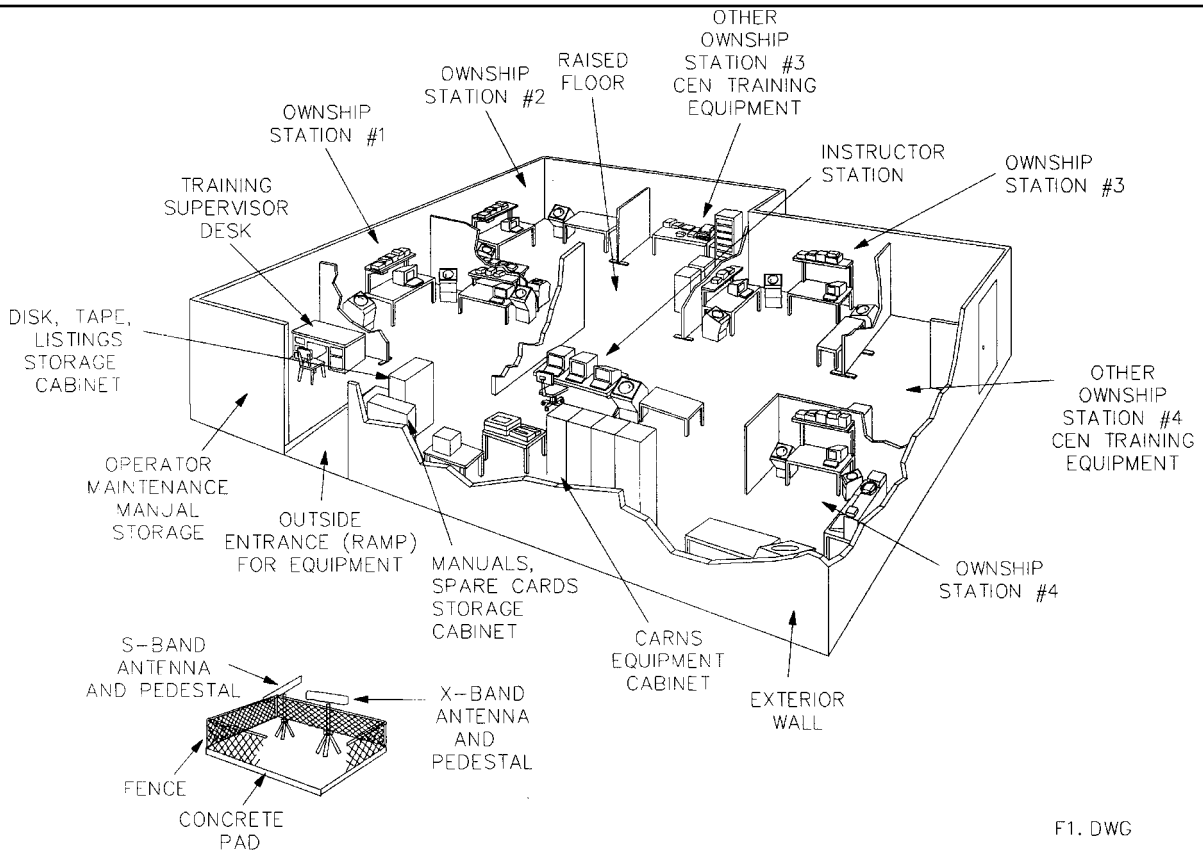
**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
To provide a classroom installation that duplicates radar and navigational signals and relays these signals to receivers which provide audio, visual, or a combination of both for training and certification of maritime personnel. Four types of navigational aids can be demonstrated by using the nucleus of the device (computer and interface) plus the proper receivers.

**Functional Description:**
DVC 55-l0A utilizes a digital microcomputer which is interfaced to radar and NAVAID displays. Exercises stored on disk simulate ownships, vessels, and harbors or shorelines. The student is positioned in front of a Plan Position Indicator (PPI). The instructor selects the exercise and can manually make changes to the exercise parameters. The instructor can select stored exercises for a LORAN, OMEGA, or ADF (or all) that demonstrate the correct use of the receivers.

CARNS is a four ownership system: it has four observer student stations. Each student station contains radar displays, navigation receivers and radios.

Student interactions with the instructor, such as briefing/debriefing, question/answer, data input, etc. are enabled by CRT/keyboard terminals located at all student stations. Over 90 exercises are included as well as a complete lesson plan package.




**Physical Information:**

| Item | W" | H" | D" | Weight(lb) |
|---|---|---|---|---|
| CARNS Equipment Cabinet: | 63 | 77 | 31 | 1,200 |
| Instructor's Station: | | | | |
| Table: | 72 | 26 | 30 | 35 |
| Keyboard Display: | 18 | 14.5 | 14.25 | 41 |
| Printer LAIOO-CA/JKSR: | 22 | 7 | 15.5 | 25 |
| Plotter DMP-29: | 22 | 5.5 | 19 | 25 |
| Radar Display w/Video Select Switch: | 28 | 46 | 29 | 165 |
| 12' B&W Monitor: | 22 | 24 | 18 | 53 |
| 19' CRT Monitor (Digitizer Display): | 19 | 18 | 20 | 56 |
| Joy Stick: | 10 | 7 | 4 | 2 |
| Data Bid Pad: | 16 | 3 | 16 | 10 |
| Radio Telephone RAY 66: | 9 | 4.5 | 14.25 | 7 |
| Student's Station: | | | | |
| Radar Display (8): | 28 | 46 | 29 | 165 |
| Ownship Control Unit (4): | 19 | 9 | 1 | 620 |
| Keyboard Display (VT101) (8): | 18 | 14.5 | 14.25 | 41 |
| Fathometer Controller: | 8.5 | 4 | 13 | 5 |
| Fathometer (6): | 12 | 4.25 | 13.75 | 25 |
| Loran-C (6): | 8.24 | 4.5 | 10.25 | 8.9 |
| ADF (6): | 13.75 | 13.4 | 14.5 | 70 |
| Omega (6): | 15 | 15 | 18 | 12 |
| Chart Table (6): | 72 | 38 | 30 | 30 |
| Radio Telephone Ray 66 (8): | 9 | 4.5 | 14.25 | 7 |

**Equipment Required, Not Supplied:**

None

**Special Installation Requirements:**

The trainer dissipates approximately 27,000 BTU per hour. It can be expected to withstand the following environmental conditions:

Temperature: 50° to 120° F (Operating), -40° 150° F (Nonoperating) 10° to 49° C (Operating), -40° to 66° C (Nonoperating)

Humidity, noncondensing: 10% to 90% (Operating), 5 to 95% (Nonoperating).

No special ducting is required. The free standing equipment rack is provided with sufficient fans to induce cooling air into the rack.

**Power Requirements:**

208 vac, 60 Hz, 3-phase, 4 wire

120 vac, 60 Hz

**Applicable Publications:**

TD 55-6940-701-14-1

Commercial Computer Documentation Set (CCDS) Volumes -2 thru -56

Instructor's Utilization and On-The-Job Training Handbooks

**Reference Publications:**

Dutton's "Navigation and Piloting" (Maloney)

"Radar Instruction Manual" Maritime Administration, US Dept. of Commerce, January 1978

"Radar Navigation Manual", publication 1310, Defense Mapping Agency, Hydrographic/Topographic Center

**Training Requirements Supported:**

MOSC's 500A, 510A

Marine Warrant Officer preappointment and advanced training

Marine Radar Observer Courses (one specifically for air cushion vehicle personnel, and another for certificate renewal)

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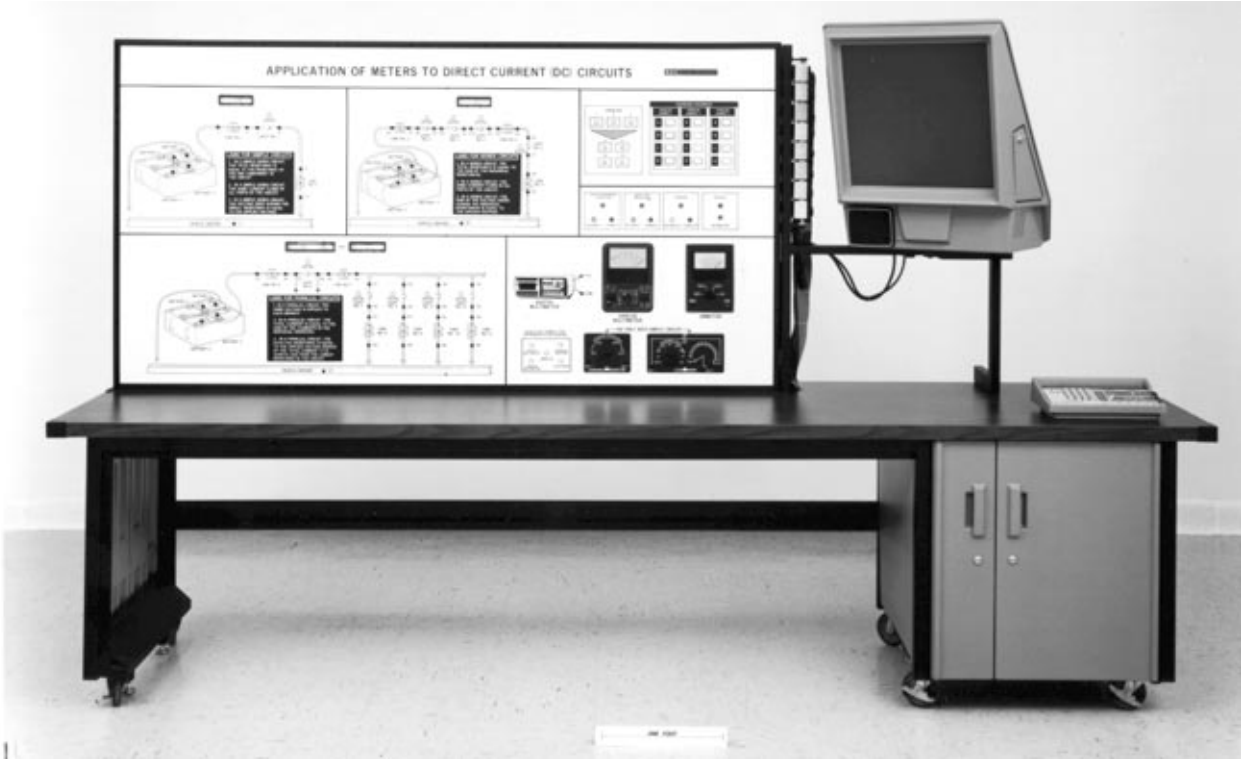
# APPLICATION OF METERS TO DIRECT CURRENT (DC) CIRCUITS




**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
For classroom use to provide training and familiarization in taking measurements on various circuit types (simple series, and parallel). The trainer provides maintenance personnel with training in proper test instrument selection and operation for different simulated circuit types.

**Functional Description:**
Device 55-11 is a computer-based training system, providing test instrument operating characteristics for various types of circuits.

The device consists of a display panel of simulated circuit types and test instruments (ammeter, analog multimeter, digital multimeter, loadbank, and variable resistor), and EC 3 computer, video-disc player and monitor, control console, two diskette drive units, visuals, two flexible diskettes, trainer power cable, operator's manual, and maintenance manual. Five test lead assemblies are also supplied with the trainer.

This student/instructor operated device is designed for demonstration or student exercise hands-on use and requires minimal familiarization time. No warn-up time, special cooling, or special maintenance personnel are required.

Student motivation is accomplished through 22 unique exercises and immediate performance feedback as the student uses the various simulated test equipment to take measurements on the appropriate circuit type.

Through the use of the control console, the simulated circuits and test instruments on the display panel respond according to actual test instrument circuit interface. Student performance is monitored by indicators contained on the control console to indicate total time to solve the problem. Display panel switches allow the student- to select and answer exercise problems, check instrument selection and test procedure and call up information on the videodisc monitor.

Display panel indicators provide exercise problem, instrument selection, and test procedure feedback.

**Physical Information:**
120" L x 71" H x 29" D; 485 lb

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
The trainer is designated to operate in a standard classroom within a temperature range of 30° F to 100° F and a relative humidity of up to 80%.

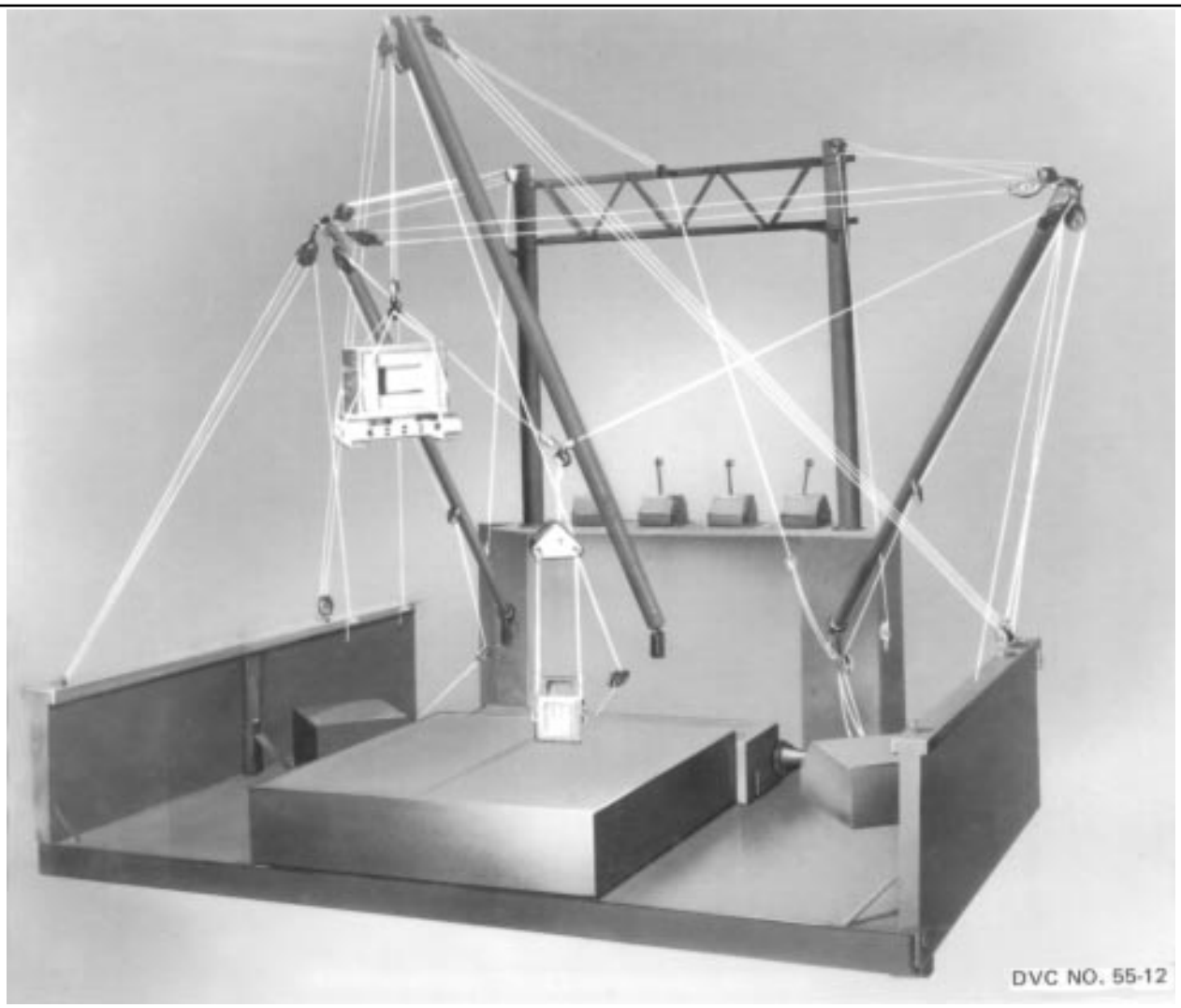
**Power Requirements:**
115 vac, single-phase, 60 Hz, 15A

**Applicable Publications:**
TM 9-6910-249-10, Operator's Manual for Application of Meters to Direct Current (DC) Circuits Device 55-11
TM 9-6910 249-24&P, Organizational, Direct Support, and General Support Maintenance Manual Including
Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts) for Application of Meters to Direct
Current (DC) Circuits, Device 55-11

**Reference Publications:**
None

**Training Requirements Supported:**
MOSC 63B

# CARGO HANDLING TRAINER




**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
This trainer is used in classrooms to instruct stevedore personnel in the principles and procedures of cargo handling, the rigging of cargo booms and related gear, and to demonstrate shipboard cargo handling procedures. The specific training requirements supported are shown following the descriptive data.

**Functional Description:**
The device is a one-eighth scale mockup of a typical AKA kingpost and boom system with operating booms, electric winches, and related rigging.

**Physical Information:**
96" x 120" x 96"; 1070 lb

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
None

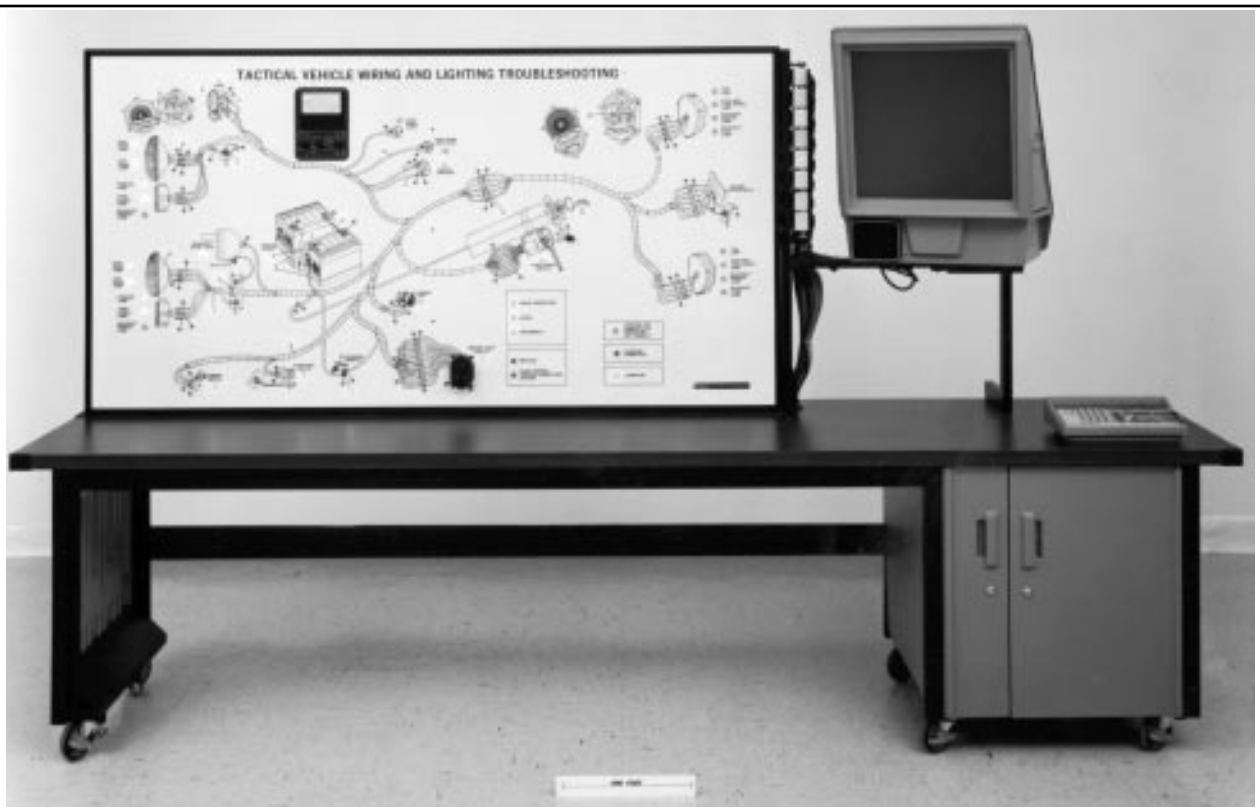
**Power Requirements:**
110 vac, single-phase, 60 Hz

**Applicable Publications:**
NAVTRADEV P-4552, Operator and Maintenance Guide, Cargo Handling Training Aid, Device 11H44

**Reference Publications:**
None

**Training Requirements Supported:**
ARTEP and SM tasks associated with MOSC 57H

# TACTICAL VEHICLE WIRING AND LIGHTING TROUBLESHOOTING TRAINER




**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
For classroom use to provide maintenance training and familiarization with tactical vehicle wiring and lighting systems. The trainer provides organizational, direct support (DS), and general support (GS) maintenance personnel with training in operating procedures, symptom analysis, and troubleshooting procedures.

**Functional Description:**
Device 55-14 is a computer-based training system, providing operating and maintenance characteristics for simulated Tactical Vehicle wiring and lighting systems.

The device consists of a display panel of simulated wiring and lighting system components and multimeter, an EC 3 computer, video disc player and monitor, control console, two diskette drive units, visuals, two flexible diskettes, trainer power cable, operator's manual, and maintenance manual. Two test leads are also supplied with the trainer.

This student/instructor operated device is designed for demonstration or system maintenance hands-on use and requires minimal familiarization time. No warm up time, special cooling, or special maintenance personnel are required.

Student motivation is accomplished through 23 unique malfunction simulations, 4 measuring exercises, and immediate performance feedback as the student operates the system and multimeter.

Through the use of the control console, the simulated systems on the display panel respond with normal operation or system malfunctions similar to the actual vehicle systems. Student performance is monitored by indicators contained on the control console to indicate total time to solve the problem and components replaced.

**Physical Information:**
Length: 120" L x 71" H x 29" D; 485 lb

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
The trainer is designed to operate in a standard classroom within a temperature range of 39° F to 100° F and a relative humidity of up to 80%.

**Power Requirements:**
115 vac, single phase, 60 Hz, 15 A

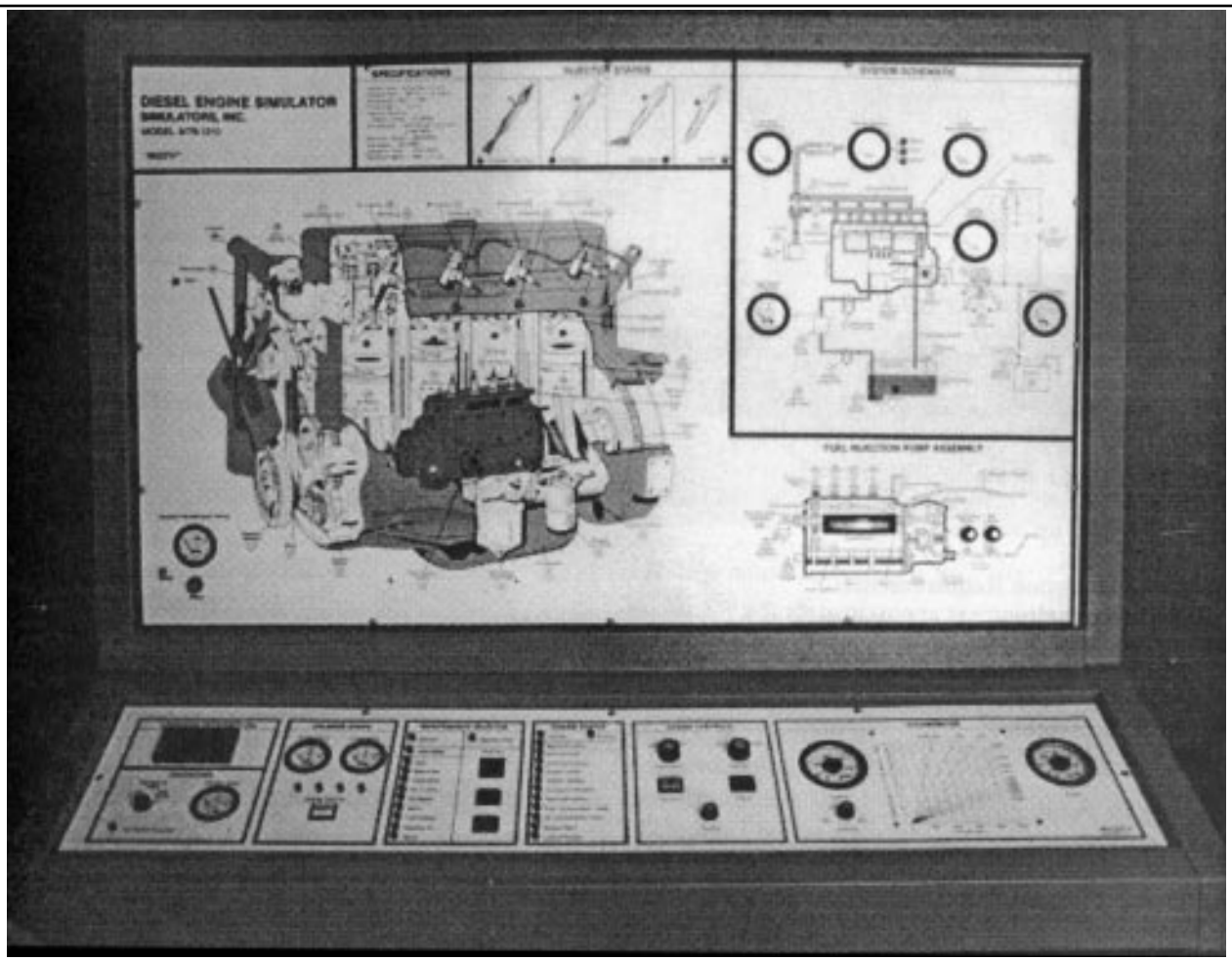
**Applicable Publications:**
TM 9-6910-251-10
TM 9-6910-251-24&P

**Reference Publications:**
None

**Training Requirements Supported:**
MOSC 63B

SM 091-474 Task
3143

# DIESEL ENGINE SIMULATOR




**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
For classroom use or shop training on Diesel Engine technology. The device is a totally electronic simulation of a typical automobile or truck type of engine. The device allows easy insertion or removal of fault conditions by the use of pre-programmed malfunctions. The device provides training for mechanics into operation and trouble-shooting techniques. It is intended to cut down on instruction time, increase trainee enthusiasm, provide theoretical and hands-on use, offer built-in testing and evaluation features and provide training at all levels.

**Functional Description:**
The simulator portrays a typical four cylinder, four cycle, turbo-charged diesel engine. The device consists of a metal cabinet with a front panel containing a graphic and schematic layout of the engine and various indicators and controls. A lower “desk” panel contains various controls, indicators, testing devices, and a built-in simulated dynamometer. An Instructors’ panel located on the side of the cabinet provides facilities for selecting, inserting and clearing fault conditions and also contains the built-in trainee evaluation devices.

The simulator is driven by a digital micro-computer located inside the cabinet. The device is fully interactive and reacts to programmed fault conditions as in a real engine.

All sub-systems of an actual engine are covered, including the fuel, electrical air and mechanical

features. The device is safe to use, cannot be damaged by incorrect trainee actions during normal use and requires no tools.

A variable speed/stop action feature is available and the simulator can also accommodate a printer to record the trainees' activity.

**Physical Information:**

Cabinet: 54" W x 44" H x 23" D (at base).
Upper Front Panel: 50" x 30"
Lower Desk Panel: 50" x 10 1/2"
Instructors' Panel: 13" x 8"
Weight: approximately 150 lb

**Equipment Required, Not Supplied:**

Table or Bench 30" high-top 60" x 30" with a non-slip top or 1/2" lip on three sides.

**Special Installation Requirements:**

Classroom environment approximately 8' x 8' minimum.
110 vac, 60 Hz electrical outlet.

**Power Requirements:**

110 vac, 60 Hz, 250 W

**Applicable Publications:**

TD 55-6910-701

**Reference Publications:**

None

**Training Requirements Supported:**

| SM 091-169 | SM 091-499 |
|---|---|
| 0112 | 1052 |
| 0306 | 1154 |
| 0308 | 1155 |
| 0309 | 1801 |
| 0310 | 1803 |
| 0317 | 1804 |
| | 1959 |
| | 1962 |
| | 3050 |
| | 3060 |
| | 3080 |

# REFRIGERATION AND AIR CONDITIONING TRAINER

**Training Category/Level Utilized:**
Transportation/Level 2

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
To provide classroom training in refrigeration and air conditioning theory with hands-on application through the performance of practical laboratory experiments.

**Functional Description:**
The Refrigeration and Air Conditioning Trainer is comprised of a number of training devices which are used to demonstrate experiments in the electrical and mechanical aspects of the refrigeration cycle and its application to all types of residential, commercial, and industrial air chilling mechanisms and controls.

All machines and control components are standard commercially available models-mounted, plumbed, wired and arranged for ease of understanding, simplification of connection, and convenience of operation.

**Physical Information:**

| Item | W" | H" | D" | Weight(lb) |
|---|---|---|---|---|
| Potential Relay Demonstrator, H-PRD | 20 | 8 | 10 | 40 |
| Refrigeration Test Branch, 262-19x | 75 | 48 | 36 | 350 |
| Commercial Refrigeration Trainer, H-CRT- 1 | 61 | 76 | 31 | 750 |
| Industrial Refrigeration Trainer, H-1RT-1 | 90 | 77 | 33 | 1000 |
| Water Cooling Tower, H-ACTK-CT | 50 | 55 | 36 | 35 |
| Portable Charging Machine, 10770 | 21 | 43 | 20 | 100 |
| Refrigeration/Freezer Training Kit, H-ACTK-2 | 40 | 40 | 26 | 300 |
| Domestic Two-Door Refrigerator Training Kit, H-ACTK-3 | 40 | 40 | 26 | 300 |
| Walk-in Cooler Training Kit, H-ACTK-5 | 40 | 40 | 26 | 300 |
| Ice Cream Freezer Training Kit, H-ACTK-7 | 40 | 40 | 26 | 300 |
| Air Conditioning Training Kit, H-ACTK-10 | 40 | 40 | 26 | 300 |
| Three-phase Compressor Controls Trainer, H-TPCT | 38 | 39 | 22 | 120 |
| Single-phase Compressor Trainer w/stand, H-CPT-1-MCI-1000 | 52 | 76 | 31 | 260 |
| Compressor Fault Simulator w/stand, H-CFS-1A-MCI-1000 | 52 | 76 | 31 | 265 |
| Oil Burner Demonstrator, H-OBD-1 | 60 | 48 | 32 | 500 |
| Oil Burner Furnace Control Demonstrator w/stand, H-0BF-2-MC1-1000 | 52 | 76 | 31 | 260 |
| Air Conditioning Controls Trainer, H-ACCS | 50 | 36 | 16 | 250 |
| Heat Pump Controls Trainer, H-HPT-1 | 38 | 39 | 22 | 120 |
| Refrigeration System Trainer, H-RST-2 | 52 | 76 | 31 | 480 |
| Basic Refrigeration Trainer, H-RST-3B | 52 | 76 | 31 | 480 |

**Equipment Required, Not Supplied:**
Standard air conditioning and refrigeration tool cabinet with tools and commercial test instruments. Fume hood or Oil Burner Demonstrator is required.

**Special Installation Requirements:**
None

**Power Requirements:**
120/240 vac, 60 Hz, single-phase 3-wire with ground
120 vac, 60 Hz, single-phase with ground

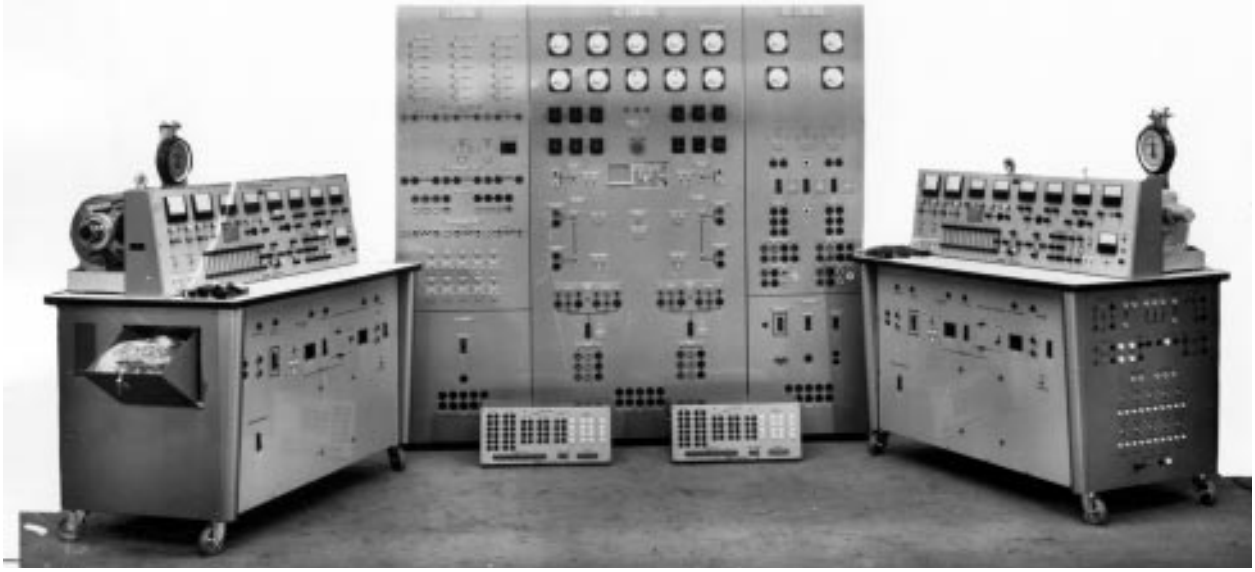
**Applicable Publications:**
TD 55-6910-723

**Reference Publications:**
Commercial Documentation

**Training Requirements Supported:**

| SM Task | |
|---|---|
| 551-750-1501 | 551-750-4504 |
| 551-750-1502 | 551-750-4507 |
| 551-750-4501 | 551-750-4508 |
| 551-750-4502 | 551-750-4509 |
| 551-750-4503 | |

# ELECTRICAL TRAINER



**Training Category/Level Utilized:**
Transportation/Level 2

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
To provide classroom training in electric power generation and control theory with hands-on application through the performance of practical laboratory experiments.

**Functional Description:**
The Electrical Trainer is comprised of a number of training devices which are used to demonstrate experiments in DC and AC power generation, as well as single- and three-phase motor and control theory, typically on various types of l/3 horsepower motors/generators. Provisions are made for experiment type training in such areas as transformer configurations, AC and DC controllers, AC and DC solid state motor drives, angular position control, DC servomotor control and coordinate linear position controllers.

All machines and control components are standard commercially available models-mounted, wired, and arranged for ease of understanding, simplification of connection. and convenience of operation.

**Physical Information:**

| Item | W" | H" | D" | Weight(lb) |
|---|---|---|---|---|
| Electrical Laboratory Switchboard, HME-3 | 85.5 | 92 | 84 | 1300 |
| Electrical Laboratory Machine, H-REM-120-CMMP (2) | 64 | 60 | 42 | 1600 |
| AC and DC Machine Experimental Student Station (12) | | | | |
| Student Station, HMD-100-CM | 65 | 60 | 34 | 1000 |
| Bedplate, MGE3-100-DG | 4 | 48 | 16 | 27 |
| DC Machine, DM-IOOA | 12 | 13.5 | 14 | 50 |
| Multifunction Machine, MFM-100 | 11 | 13.5 | 14 | 45 |
| Synchronous Machine, SM-100-3 | 10.5 | 13.5 | 14 | 60 |
| Wound Rotor Motor, VRM-100-3A | 10.5 | 13.5 | 14 | 50 |
| lnduction Motor, IM-100 | 10.5 | 13.5 | 14 | 35 |
| Universal AC Motor, ACUM-100 | 10.5 | 13.5 | 14 | 35 |
| Shaded Pole Motor, SHPM-100 | 10.5 | 13.5 | 14 | 35 |
| Split Phase Motor, SPM-100 | 10.5 | 13.5 | 14 | 35 |
| Capacitor Start Motor, CSM-100 | 10.5 | 13.5 | 14 | 35 |
| Wound Rotor Speed Controller, WRSC-100 | 5 | 12.5 | 9 | 15 |
| DC Armature Resistance Controller, DC-ARC-100 | 7 | 9 | 7 | 15 |
| Variable AC Voltage and Paralleling Controller, H-IEC-B1 | 7.56 | 19 | 6.25 | 25 |
| Alternator Voltage Controller, H-IEC-B2 | 7.56 | 19 | 6.25 | 25 |
| Power Factor Controller, H-IEC-B3 | 7.56 | 19 | 6.25 | 25 |
| Adjustable Frequency Speed Controller, ... H-IEC-B4: | 7.56 | 19 | 6.25 | 25 |
| DC Motor Mag-Amp Controller, H-IEC-DC1 | 7.56 | 19 | 6.25 | 25 |
| DC SCR-Controller, H-IEC-DC2 | 7.5 | 12 | 8 | 25 |
| Manual DC Starter DC-MS-100 | 8.5 | 14 | 8 | 20 |
| Automatic DC Starter, DC-AS-100 | 7.5 | 19 | 8.25 | 30 |
| Automatic DC CEMF Starter, DC-CEMF-100 | 7.5 | 19 | 8.25 | 30 |
| Three-Phase AC Magnetic Starter, MS-100-3A | 7.5 | 9 | 7 | 20 |
| Resistance Load, RL100A | 5 | 19 | 8.25 | 30 |
| Resistance/Reactance Load RLC-100 | 7.5 | 19 | 8.25 | 50 |
| Variable Inertia Load, VIL-100 | 10 | 20 | 14 | 40 |
| Series Field Rheostat, SFR-100 | 7.25 | 5 | 4.75 | 2 |
| Speed Control Rectifier, SCR-100B | 7.5 | 19 | 8.25 | 25 |
| Prony Brake, PB-100 | 14 | 11 | 16 | 25 |
| Dynamic Brake, DB-100 | 7.25 | 5 | 4.75 | 5 |
| DC Injection Brake, DCIB-100 | 7.5 | 9 | 7 | 10 |

| Item | W" | H" | D" | Weight(lb) |
|---|---|---|---|---|
| Electro Dynamometer, DYN-100A-DM | 19 | 13 | 14 | 70 |
| Strobe Tachometer, SLA-100-D | 5.5 | 4 | 6.75 | 2 |
| Synchronous Lamp, SYN-100 | 7.5 | 9 | 7 | 10 |
| Phase Sequence Indicator PSI-100 | 7.5 | 9 | 7 | 10 |
| Digital Photo Tachometer, HPT-100 | 3.5 | 6 | 6.25 | 5 |
| Tachometer, HT-100-H | 1.5 | 4.75 | 3.75 | 2 |
| Transformer Learning Package (12): | | | | |
| Experimental Transformer, T-100A(3) | 7.5 | 9 | 7 | 15 |
| Dissectable Transformer, 1290B-6C | 7 | 16 | 16 | 20 |
| Dissectable Storage Case, HC-1290 | 7 | 16 | 16 | 20 |
| AC Controller, ACC-100-FT (12) | 24.375 | 37 | 15 | 140 |
| DC Controller DCC-100-FT (12) | 24.375 | 37 | 15 | 140 |
| Modular AC Motor Controller, ACC-100-K (12) | 24 | 25 | 10 | 150 |
| Modular DC Motor Controller, DCC-100-K (12) | 24 | 25 | 10 | 150 |
| Three Phase Frequency Drive, H-VFD-100-A (12) | 18 | 23 | 12 | 120 |
| Single Board Microcomputer Unit (12) | 4 | 12.5 | 12.5 | 15 |
| Microcomputer, MCB-1 | 4 | 12.5 | 12.5 | 15 |
| Experimental Board Section Accessory, EBA-2 | 1.5 | 8.5 | 4.5 | 1 |
| Solid State Relay Interface, EBA-3 | 1.5 | 8.5 | 4.5 | 1 |
| Angular Position Control Unit (12): | | | | |
| Angular Position Controller, H-IEC-A | 7.56 | 19 | 8.25 | 25 |
| Unipolar Stepper Motor, H-IEC-A1 | 7.5 | 7.25 | 7.25 | 5 |
| Bipolar Stepper Motor, H-IEC-A2 | 7.5 | 7.25 | 7.25 | 5 |
| DC Servo Motor Unit H-IEC-DCS (12) | 7.56 | 19 | 8.25 | 25 |
| Multiple Axis Linear Position Trainer, H-IEC-XY (12) | 7.5 | 12 | 8.5 | 20 |

**Equipment Required, Not Supplied:**
Optional: Dual Trace Oscilloscope

**Special Installation Requirements:**
None

**Power Requirements:**
208 vac, 60 Hz, 3-phase 4-wire with ground
120 vac, 60 Hz, single-phase with ground

**Applicable Publications:**
TD 55-6910-722

**Reference Publications:**
Commercial Documentation

**Training Requirements Supported:**
SM Task
551-727-1204 551-749-1704
551-746-1501 551-749-2501
551-746-1506 551-749-2503
551-746-1508 551-749-2505
551-747-1201 551-749-2507
551-749-1201 551-749-2508
551-749-1501 551-749-2510
551-749-1502 551-749-2515
551-749-1503 551-749-2516
551-749-1504 551-749-2520
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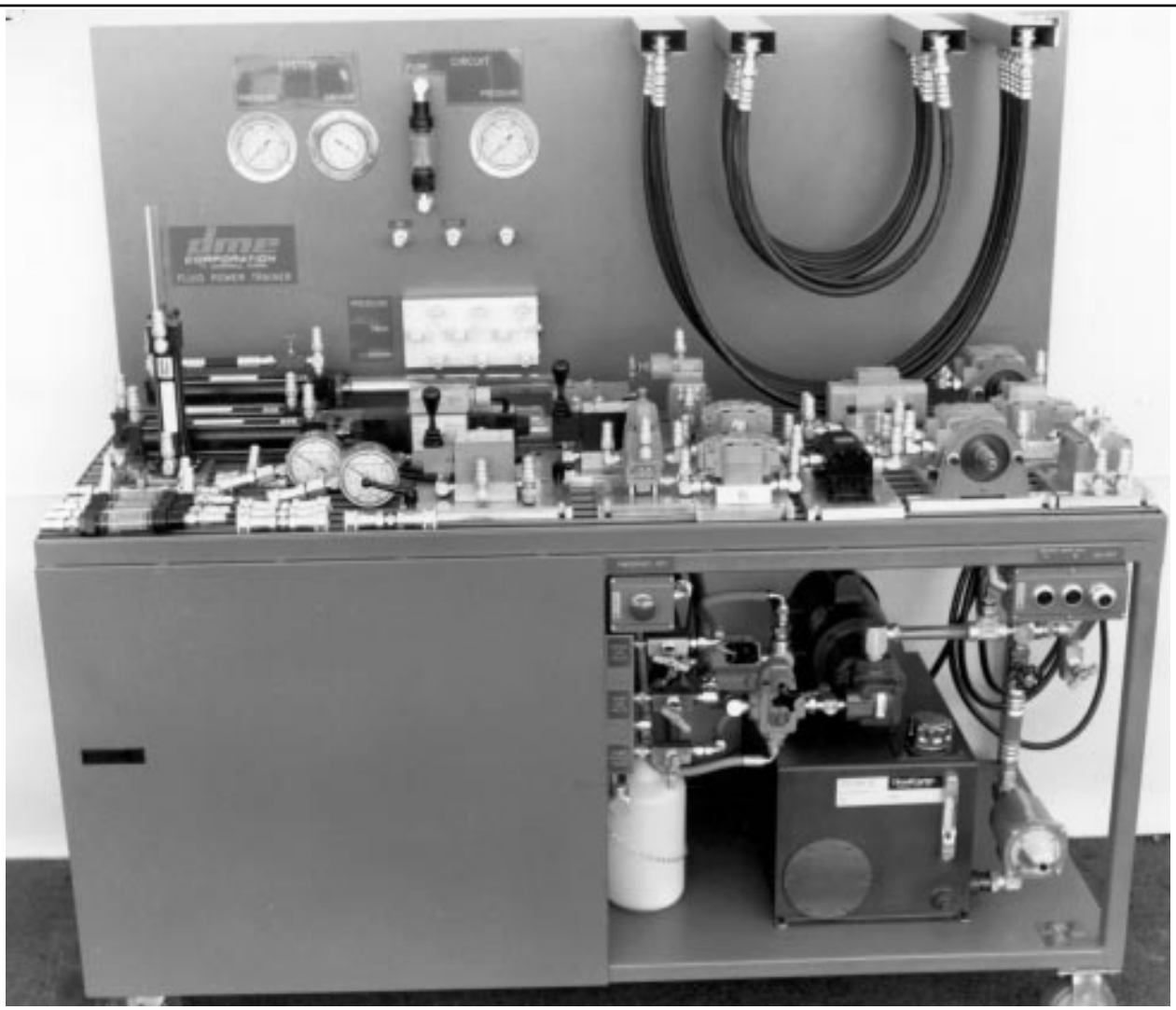
551-749-1513 551-749-2525
551-749-1514 551-749-2506

# HYDRAULIC TRAINER



**Training Category/Level Utilized:**
Transportation/Level 1

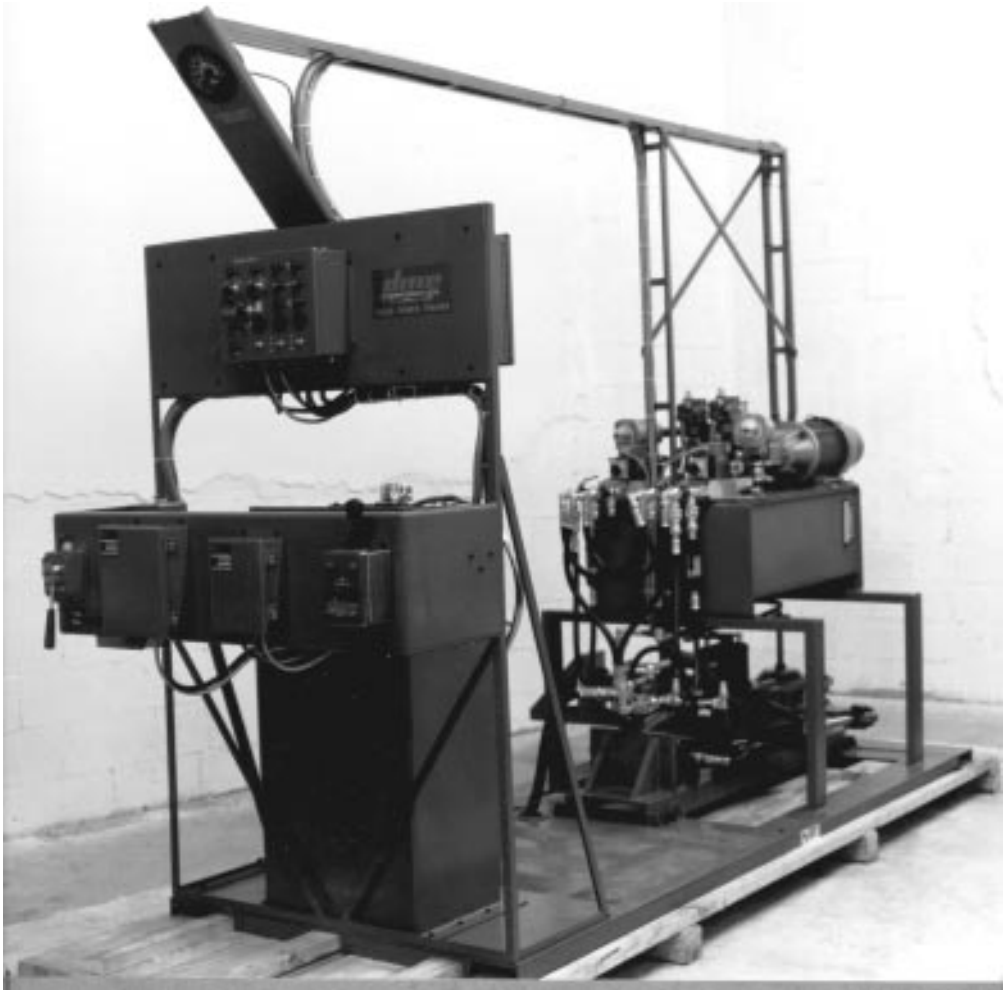
**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production)

**Purpose of Trainer:**
For classroom use to provide training and familiarization in hydraulic circuit design and maintenance. The trainer provides personnel with training in configuring hydraulic circuits for a variety of operations using operational hardware. The trainer also provides maintenance and troubleshooting training for typical hydraulic system malfunctions and the opportunity to observe and operate a fully functional ship hydraulic steering system.

**Functional Description:**
Device 55-22 consists of two separate hydraulic assemblies: (I) the Student Hydraulic Training Bench, and (2) the Hydraulic Steering System Demonstrator. Each assembly is a self-contained fully functional system incorporating a hydraulic power source and operational hydraulic components.

The Student Hydraulic Training Bench provides entry and advanced level training in hydraulic systems assembly, maintenance, troubleshooting. and repair. Each bench is a fully operational independent test station equipped with a hydraulic power unit, instrument panel, and quick-mount component mounting surface for hydraulic circuit assembly and component disassembly. A full set of hydraulic components are provided with the bench, including manual and solenoid directional control valves, linear actuators, motors, a flow divider, and deceleration, sequencing, brake, check and flow control valves. Additional pumps,



motors, actuators, and control valves are provided for disassembly and assembly.

Hydraulic power is provided by an electrically driven, fixed displacement pump rated at 1.5 gallons per minute at 1000 psi. A compound relief valve limits system pressure to 500 psi at all times. All hydraulic fluid power for circuit assembly is obtained from ports on the panel-mounted manifold.

Hydraulic circuits typically found in marine, industry, and aerospace applications can be assembled using the hydraulic components provided, and quick disconnect hoses. Two 4-inch pressure gauges, a vacuum gauge, and a flowmeter are panel mounted to monitor system performance. Additional quick-disconnect pressure gauges and flowmeters, included with each bench, may be inserted at any point in the assembled circuits.

All components used on the bench are commercial off-the-shelf items mounted on quick-mount subplates to secure components operating under pressure. Two lengths of quick disconnect hoses, are suspended from a rack for ease of access and use.

The Hydraulic Steering System Demonstrator is a complete, independent, fully functional marine steering system mounted on a rigid foundation. The demonstrator consists of a duplex hydraulic power unit, a hydraulic steering engine, an emergency-hand hydraulic system, a full follow-up control system, a non follow-up control system, a rudder angle indicator system, and a rudder loading system. Quick disconnects between all major system components allow connection of pressure gauges and flowmeters to monitor system performance. All components used on the demonstrator, including all controls and indicators, are typical of hardware actually used shipboard.

The system is configured to show the functional elements of a ship steering system in a compact, accessible assembly. A control console allows student to experience the “feel” of the helmsman’s controls. Quick, realistic, and positive response of the steering system is provided by the demon-

strator, and a rudder loading system simulates rudder forces typical of a vessel under way.

**Physical Information:**
Student Hydraulic Training Bench:
72" L, 70" H (Overall), 40" H (Work Surface), 30" W
Hydraulic Steering System Demonstrator
Length: 110" L, 72" H (Disassembled), 86" H (Assembled), 44" W

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
Student Hydraulic Training Bench:
None
Hydraulic Steering System Demonstrator:
Designed for permanent installation in a classroom or laboratory. The demonstrator is to be wired directly to 220 vac power.

**Power Requirements:**
Student Hydraulic Training Bench:
120 vac, 60 Hz, 20 A
Hydraulic Steering System Demonstrator:
220 vac, 60 Hz, 40 A, 3-phase

**Applicable Publications:**
TD 55-6910-724-1
TD 55-6910-724-2
TD 55-6910-724-3

**Reference Publications:**
None

**Training Requirements Supported:**
MOSC

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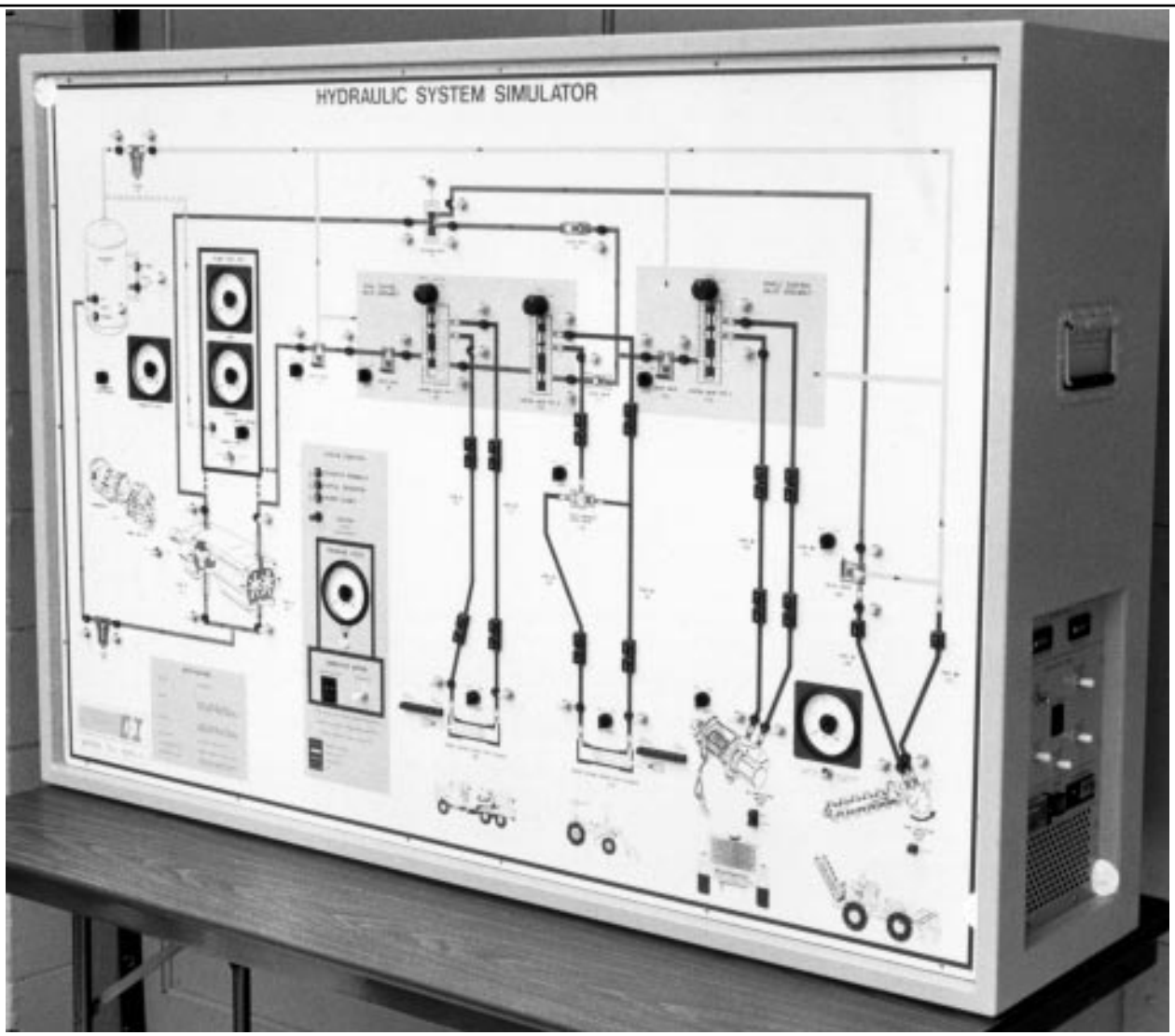
# HYDRAULIC SYSTEMS SIMULATOR




**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production)

**Purpose of Trainer:**
For classroom use or shop training on Hydraulic Technology. The device is a totally electronic simulation of a typical Hydraulic System. The device allows easy insertion or removal of fault conditions by the use of preprogrammed malfunctions. The device provides training for mechanics into operation and troubleshooting techniques. It is intended to cut down on instruction time, increase trainee enthusiasm, provide theoretical and hands-on use, offer built-in evaluation features and provide training at all levels.

**Functional Description:**
The simulator portrays a typical Hydraulic System. The device consists of a metal cabinet with a front panel containing a schematic layout of the Hydraulic System. It contains various indicators, controls, and testing devices. An Instructor Panel located on the side of the cabinet provides facilities for selecting, inserting, and clearing fault conditions. It also contains the built-in trainee evaluation devices.

The simulator is driven by a micro-computer located inside the cabinet. The device is fully interactive and reacts to programmed fault conditions as in a real Hydraulic System.

Subsystems of an actual Hydraulic System are covered including cylinders, one direction and bi-direction motors, control valves, solenoid valve, pumps, and test equipment. The device is safe to use, cannot be damaged by incorrect trainee actions during normal use and requires no tools.

**Physical Information:**
60" L x 40" H x 14: D; 120 lb

**Equipment Required, Not Supplied:**
Table or bench 30" high, top 60" x 30" with a non-slip top or 1/2" lip on three sides.

**Special Installation Requirements:**
Classroom environment, approximately 8' x 8' minimum
120 vac, 47 to 64 Hz electrical outlet

**Power Requirements:**
120 vac, 47 to 64 Hz

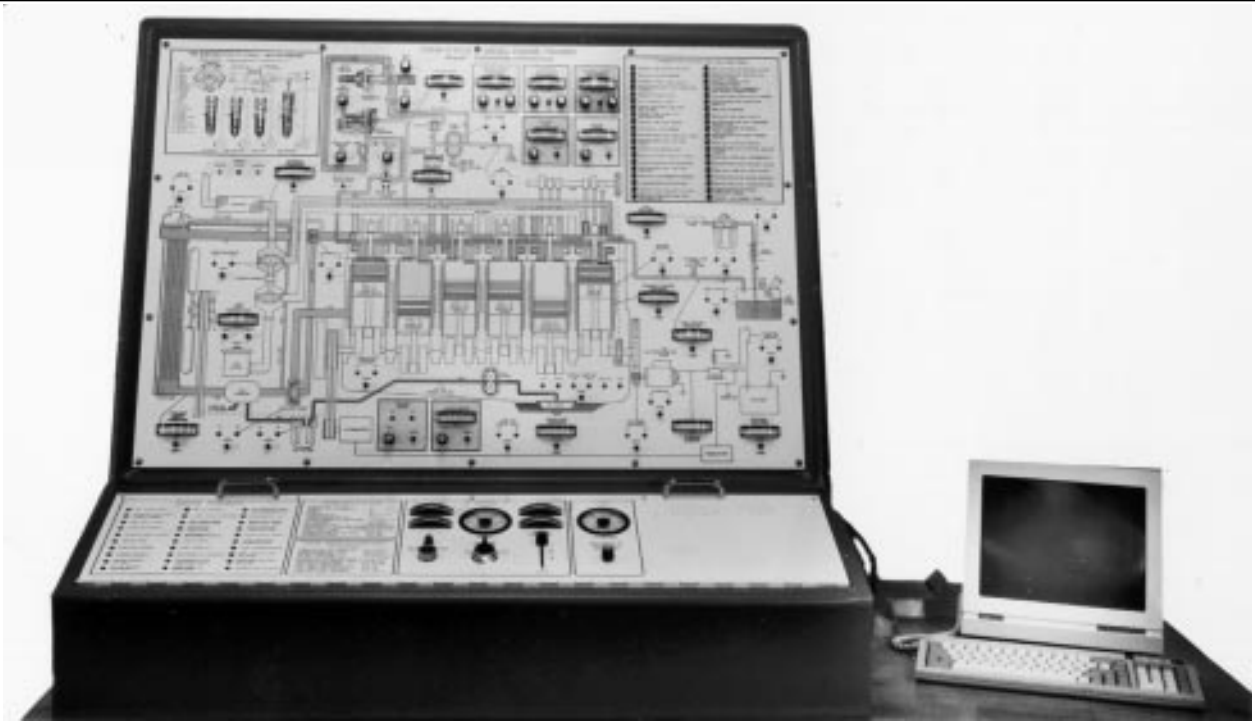
**Applicable Publications:**
TD 55-6910-725, Operation and Maintenance Manual for Hydraulic System Simulator

**Reference Publications:**
None

**Training Requirements Supported:**
MOSC

| | |
|---|---|
| 63H10 | 630V |
| 63W10 | 630C |
| 63B30 | 630D |
| 63H30 | 630E-AWOC |
| 63D30 | |

# 4-CYCLE DIESEL ENGINE TRAINER



**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production)

**Purpose of Trainer:**
To provide classroom training in troubleshooting the maintenance requirements associated with heavy duty marine and automotive diesel engine systems.

**Functional Description:**
55-24 utilizes a digital microcomputer along with hardware to depict the major components of a 4-cycle turbocharged diesel engine. The front panels of the table top mounted trainer consist of graphics, switches, meters, potentiometers and indicators covering the engine's fuel, air intake, cooling, exhaust, lubrication, and electrical systems. The instructor's CRT/Keyboard terminal is used to establish the operating mode, insert or clear 40 malfunctions, and determine student performance.

**Physical Information:**
Four-cycle Diesel Trainer, H-CD-46: 47.5" W x 40.25" H x 27" D; 225 lb
CRT/Keyboard: 18" W x 15" H x 16" D; 15 lb

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
None

**Power Requirements:**
120 vac, 60 Hz, 1-phase with ground, 5 A maximum

**Applicable Publications:**
Commercial Documentation

**Reference Publications:**
None

**Training Requirements Supported:**
MOSC 88L Series
MOSC 880A

# 2-CYCLE DIESEL ENGINE TRAINER

**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production)

**Purpose of Trainer:**
To provide classroom training in troubleshooting the maintenance requirements associated with heavy duty marine and automotive diesel engine systems.

**Functional Description:**
DVC 55-25 utilizes a digital microcomputer along with hardware to depict the major components of a 2-cycle turbo charged diesel engine. The front panels of the table top mounted trainer consist of graphics, switches, meters, potentiometers and indicators covering the engine's fuel, air intake, cooling, exhaust, lubrication, and electrical systems. The instructor's CRT/Keyboard terminal is used to establish the operating mode, insert or clear 40 malfunctions, and determine student performance.

**Physical Information:**
Two-cycle Diesel Trainer: 47.5" W x 40.25" H x 27" D; 225 lb
CRT/Keyboard: 18" W x 15" H x 16" D; 15 lb

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
None

**Power Requirements:**
120 vac, 60 Hz, 1-phase with ground, 5 A maximum

**Applicable Publications:**
Commercial Documentation

**Reference Publications:**
None

**Training Requirements Supported:**
MOSC 88L Series
MOSC 880A

# DRIVER SKILLS TRAINER

**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
To train potential drivers and improve the driving skills of experienced drivers.

**Functional Description:**
The Driver Skills Trainer consists of four major components: a visual system composed of 60 inch monitors, a truck cab with controls and instrumentation, an instructor work station which has the ability to change student environment/ traffic/ hardware conditions, and a computer system controlling simulation/sound/graphics.

The simulator has the vehicle characteristics of a basic tractor trailer truck pulling either a 48' or 53' trailer with loads of 40,000 or 80,000 pounds - either properly or improperly (front, rear, center, or top heavy) loaded. The device will simulate either an automatic or a 9 speed manual transmission.

Driving simulation includes whatever a real vehicle could do; including driving off road or the wrong way on a one way street. Hill, curve, city, rural, and loading docks scenarios are available.

The device will score the student on observation of speed limits, gear changes/grinds, collisions, fuel economy/brake usage, following too close, and centering of vehicle in traffic lane.

The simulator can also be installed in a 48' air-ride, air conditioned van yielding a self-contained, portable, 12 student classroom.

**Physical Information:**
13' 11" L x 17' 3" W x 78" H; 1,500 lbs
Computers:
*a.* CISC and RISC simulation processors
*b.* 3 channels of image generation
*c.* Work station with color monitor, keyboard, and mouse.
Visual Projection System:
Three high-gain, color, self-contained, rear projection video display units.

**Equipment Required, Not Supplied:**
None

**Special Installation Requirements:**
Temperature: 60° to 80° F
Humidity: 10% to 95% (non-condensing)

**Power Requirements:**
115/120 vac, 50/60 Hz

**Applicable Publications:**
None

**Reference Publications:**
None

**Training Requirements Supported:**
88M10
88M30
88M40

# CRANE OPERATOR TRAINING SYSTEM


**Training Category/Level Utilized:**
Transportation/Level 1

**Logistic Responsible Command, Service, or Agency:**
STRICOM

**Source and Method of Obtaining:**
Not generally available for issue (limited production).

**Purpose of Trainer:**
The crane simulator is a computerized, full mission trainer, that simulates the operating controls and handling characteristics of the hagglund ship tower crane, dock gantry crane, and the 40 ton rough terrain container crane. The simulator creates deployment scenarios that require army crane operators to on-load / off-load m1a1 battle tanks, and bradley fighting vehicles from various ocean going cargo vessels.

**Functional Description:**
Commuter based system : silicon graphics 1000 system. Operates in real time to simulate out-the-window viewing from the crane cab. Generates full color scene content of a crane operating from an ocean vessel. Pier and on a beach. Has a sound system that produces a variety of sounds of the crane operating environment, including crane engine noises, collisions, hoist and trolley noises. Has 3 degree of freedom electric motion system capable of providing motion sensations to the operator, including the sensation of crane depression when a heavy object is raised, up or down, shock and payload. Has a number of portable subsystems, laptop configuration, that replicates control systems, movement and lift actions and reactions as and introduction to the full motion system.

**Physical Information:**
(Information not available)

**Equipment Required, Not Supplied:**
(Information not available)

**Special Installation Requirements:**
(Information not available)

**Power Requirements:**
(Information not available)

**Applicable Publications:**
TD 55-6930-701, Crane Operator Training System; Operator's Manual
TM 55-6930-701, Crane Operator Training System; Maintenance Manual

**Reference Publications:**
(Information not available)

**Training Requirements Supported:**
(Information not available)

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